REMARKS

Introduction

Status of claims

Claims 1 to 6 have been examined on the merits.

Claims 1 to 6 are pending.

Claims 1, 2, and 3 have been amended.

Support for Amendments to claims

Support for amended Claim 1 is found at page 2, lines 17 to 34 where the nature of the fibers and fiber bundles, and the nature of the matrix of the composite are explained.

Amended claim 2 has been reworded by explaining the expression "composite body" by "body made of a composite" which is clearer, but means the same, and putting the same in the beginning of the amended claim. The term "non-conducting or semi-conducting" to describe the ceramic matrix has been borrowed from claim 1.

Claim 3 has been reworded to depend from claim 2.

No new matter has therefore been introduced, and entry of the amended claims is respectfully requested.

The Office Action

Rejection under 35 U. S. C. § 112

Claims 1 to 6 have been rejected under 35 U. S. C. §112 , second paragraph, as being indefinite for not particularly pointing out and distinctly claiming the subject matter which applicants regard as the invention.

It is believed that by virtue of the amendments made to claims 1, 2, and 3, all objections under 35 U. S. C. § 112, second paragraph have been addressed and

rendered moot.

Claims 1-6 are now in proper form and in full compliance with 35 USC §112.

Rejection under 35 U. S. C. 102 (a) and (b)

Claims 1 to 6 have also been rejected under 35 U. S. C. 102 (a) as being anticipated by Beck, EP 1,241,473 A1.

Beck, in EP 1,241,473 A1, teaches a process for non-destructive testing of carbide-containing alloys. These alloys are metallic, as is detailed in column 1, line 18 to 21. Specifically, the alloys described in the Beck reference are the so-called superalloys based on nickel or cobalt (see column 4, line 26 to 28) which are coated with a protective layer based on an alloy of the type MCrAlY, where M is selected from the group consisting of iron, cobalt and nickel, Cr stands for chromium, Al stands for aluminum, and Y stands for yttrium, lanthanum and other rare earth metals (see column 4, lines 28 to 32). The method described by Beck is limited to the detection of oxidized carbide near the surface (see column 3, lines 3 to 6). The Beck reference is therefore just another example of the use of the eddy current method as discussed on page 3, lines 24 to 27, of the present application where it is detailed that in such conductive materials, a skin effect can be observed which leads to the consequence that only the surface layer of the material can be inspected. This is also what is stated in the Beck reference, see column 3, lines 16 to 21, specifically lines 20 and 21 "oberflächennahe Oxidbereiche = oxide regions close to the surface".

The Beck reference fails to mention or suggest application of the eddy current method to a composite material having a non-conducting or semi-conducting matrix. Beck also fails to mention or suggest carbon fibers or carbon-containing fibers, nor composite bodies comprising reinforcing fibers and a matrix are not disclosed, and

silicon and silicon carbide are also never mentioned.

Therefore, claims 1-6 are not anticipated by the Beck reference.

Beck also fails to render obvious the subject matter of the instant application. This reference does not mention composites, but only metallic materials. As explained above, the applicability of the eddy current method had hitherto been described only for conducting materials. It could not have been inferred from the Beck reference that this method could also be used in a composite material comprising conductive (carbon-containing) fibers and a non-conducting or semi-conducting matrix. Therefore, the Beck reference provides no teaching that might have led a person skilled in the art to apply this method to the composites of the present invention.

Original claims 1-6 also stand rejected as anticipated by both the Plotard publication and the Nixon publication.

The Plotard reference describes the detection of oxidation cavities and cracks (first page, section "Objectives", fourth item) and detection of "unstickings between different woven parts of a structure" (ibidem, fifth item). On page 3, right hand column, under Fig. 2, it is also explained that the thickness of a silicon carbide (=non-conducting) coating on the conducting C/C substrate can be measured. On page 4, it is explained that the eddy current method can only be used to detect and measure oxidation cavities and decohesions just under the coating, i. e., close to the surface. Oxidation cavities need to have a minimum volume of 2 mm^3 (page 3, left-hand column, fourth item under 3.1). There is no reference to measure the properties or the oxidation state of the carbon fibers.

Therefore, this reference neither anticipates nor renders obvious the claimed method of detecting oxidated or non-oxidated fibers.

The Nixon reference deals with silicon carbide-coated carbon-carbon composites, and the application of eddy current measurements to such composites. Eddy current measurements divulge changes in the conductivity of both fibers and matrix. It is not possible to attribute changes in the conductivity to changes of the fibers alone, but there are always changes in conductivity measured resulting from changes in both the matrix and the fibers. As in this reference, both fibers and matrix are electrically conductive, a skin effect will be observed as taught by the Plotard reference, and the results of the measurement will only yield information about the surface layer. Nothing is taught about applying eddy current measurement to composites having a non-conducting or semi-conducting matrix. There is also nothing that would lead a person skilled in the art to try such eddy current measurements with a non-conducting or semi-conducting matrix.

In summary, eddy current measurements have been applied to electrically conductive materials. These measurements have been known to yield information about the surface layer, or a layer close to the surface of such electrically conductive materials. The information obtained is based on the deviation from an otherwise high and uniform conductivity of the conductive substrate which deviation is brought about, in the references cited, by damages such as cracks and cavities.

There is nothing in the cited art that would have led a person skilled in the art to utilize eddy current measurements to detect conducting fibers within a non-conducting or semi-conducting matrix, and to detecting changes in the conductivity of such fibers.

The present invention is based on the discovery that eddy current measurements can also be made on non-conducting substrates where conducting fibres are present which are isolated from each other by a non-conducting or semi-

conducting matrix, but there is no volume conductivity as the conductive paths are limited to the length of the fibers or the volume of the fiber bundles. This discovery is utilized as a means to detect changes in these conductive fibers in a non-conductive or semi-conducting matrix (the conductivity thereof being several orders of magnitude smaller than that of the conductive fibers). While this method may appear straightforward, it is respectfully submitted that none of the cited documents or the general knowledge about eddy current measuring techniques provides a teaching to such novel measurement techniques.

Therefore, it is deemed that the present invention is neither anticipated nor made obvious by the cited art, and favorable reconsideration is respectfully requested.

Respectfully submitted,

By Richard M. Beck

Richard M. Beck
Registration No.: 22,580
CONNOLLY BOVE LODGE & HUTZ LLP
1007 North Orange Street
P.O. Box 2207
Wilmington, Delaware 19899
(302) 658-9141
(302) 658-5614 (Fax)
Attorney for Applicant

512938